Fig.1

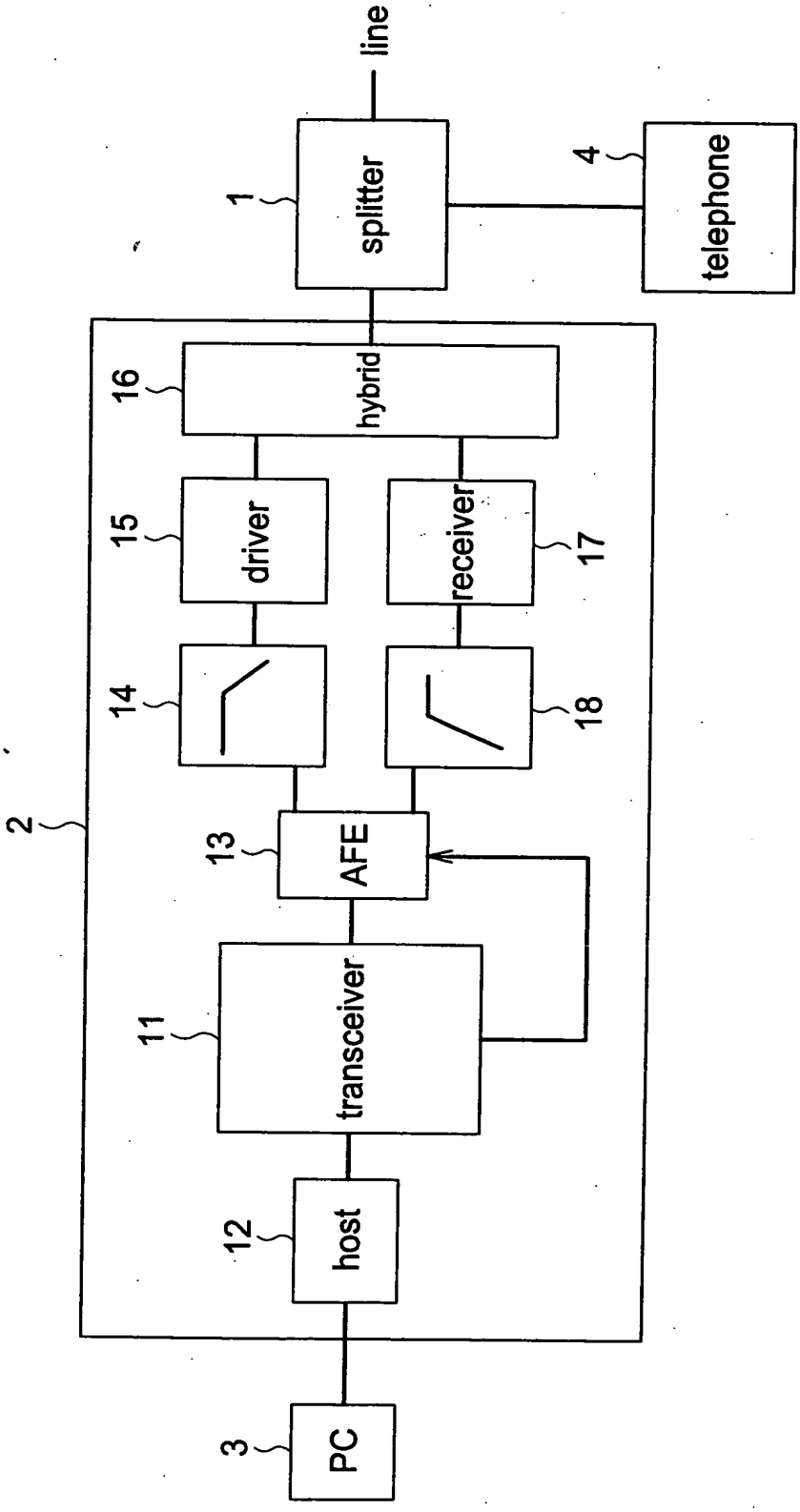
line
1
splitter
4
telephone
2
16
hybrid
15
driver
receiver
17
14
18
13
AFE
11
transceiver
12
host
3
PC

Fig.2

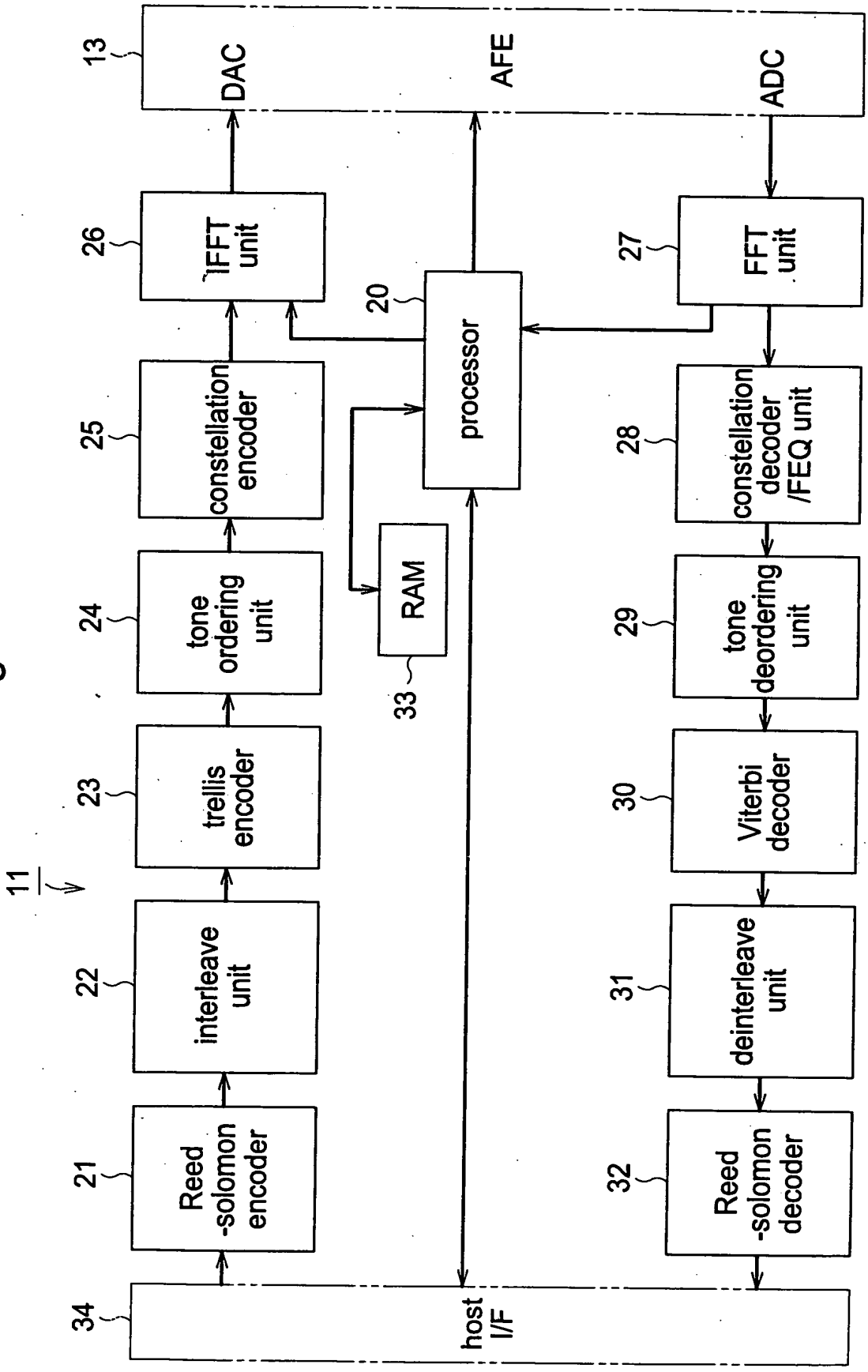
13
DAC
AFE
ADC
26
IFFT unit
27
FFT unit
20
processor
25
constellation encoder
28
constellation decoder /FEQ unit
RAM
33
24
tone ordering unit
29
tone deordering unit
11
23
trellis encoder
30
Viterbi decoder
22
interleave unit
31
deinterleave unit
21
Reed -solomon encoder
32
Reed -solomon decoder
34
host I/F

Fig.3

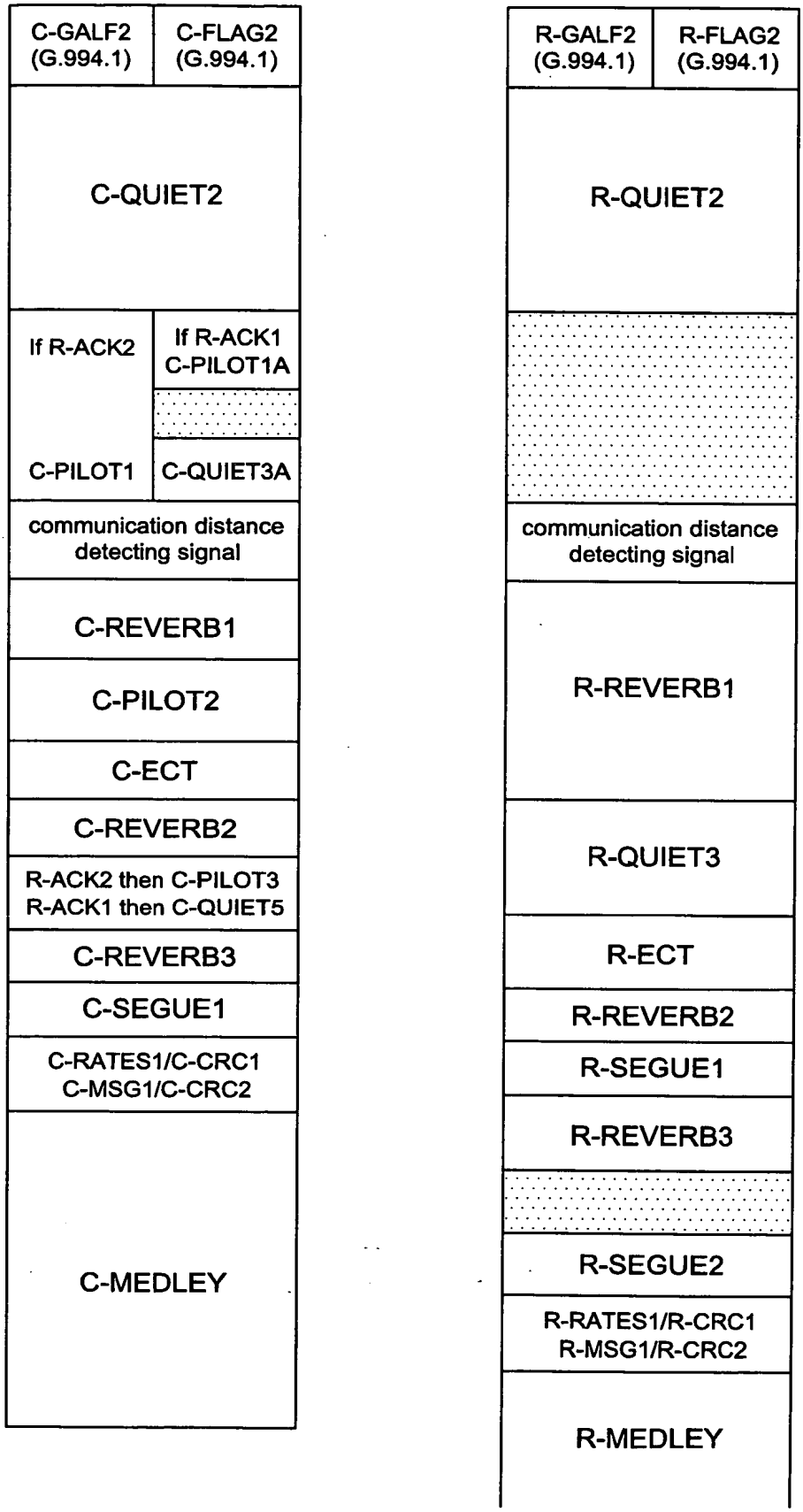
C-GALF2 (G.994.1)
C-FLAG2 (G.994.1)
C-QUIET2
If R-ACK2
If R-ACK1 C-PILOT1A
C-PILOT1
C-QUIET3A
communication distance detecting signal
C-REVERB1
C-PILOT2
C-ECT
C-REVERB2
R-ACK2 then C-PILOT3 R-ACK1 then C-QUIET5
C-REVERB3
C-SEGUE1
C-RATES1/C-CRC1 C-MSG1/C-CRC2
C-MEDLEY
R-GALF2 (G.994.1)
R-FLAG2 (G.994.1)
R-QUIET2
communication distance detecting signal
R-REVERB1
R-QUIET3
R-ECT
R-REVERB2
R-SEGUE1
R-REVERB3
R-SEGUE2
R-RATES1/R-CRC1 R-MSG1/R-CRC2
R-MEDLEY

Fig.4a

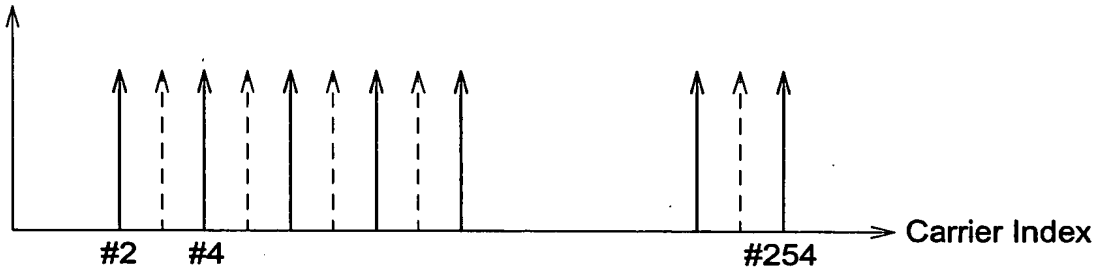

Fig.4b

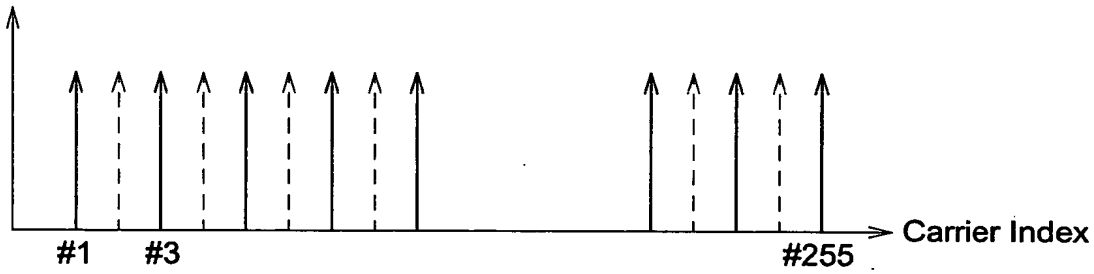

Fig.5a

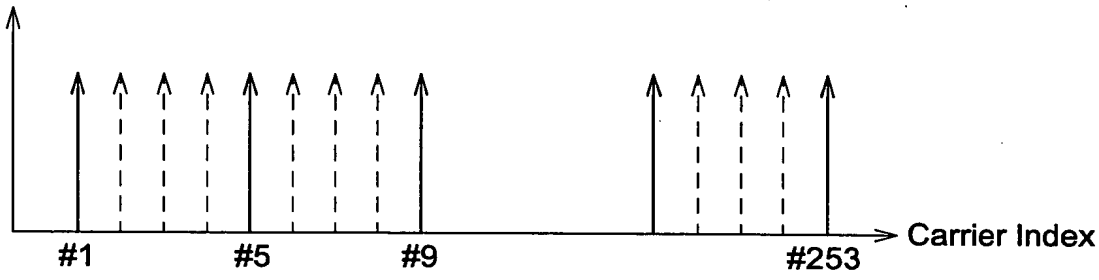

Fig.5b

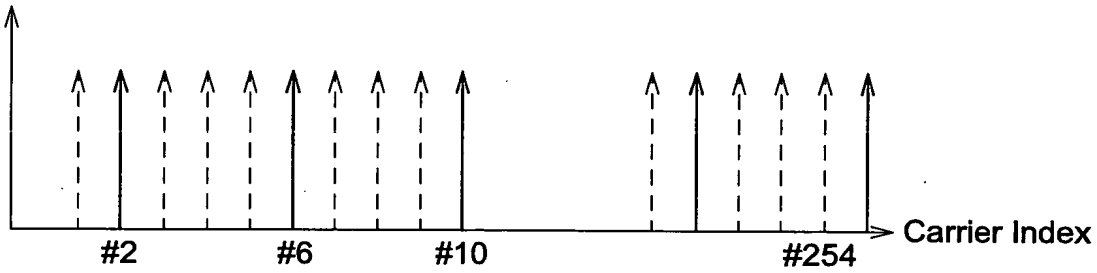

Fig.6

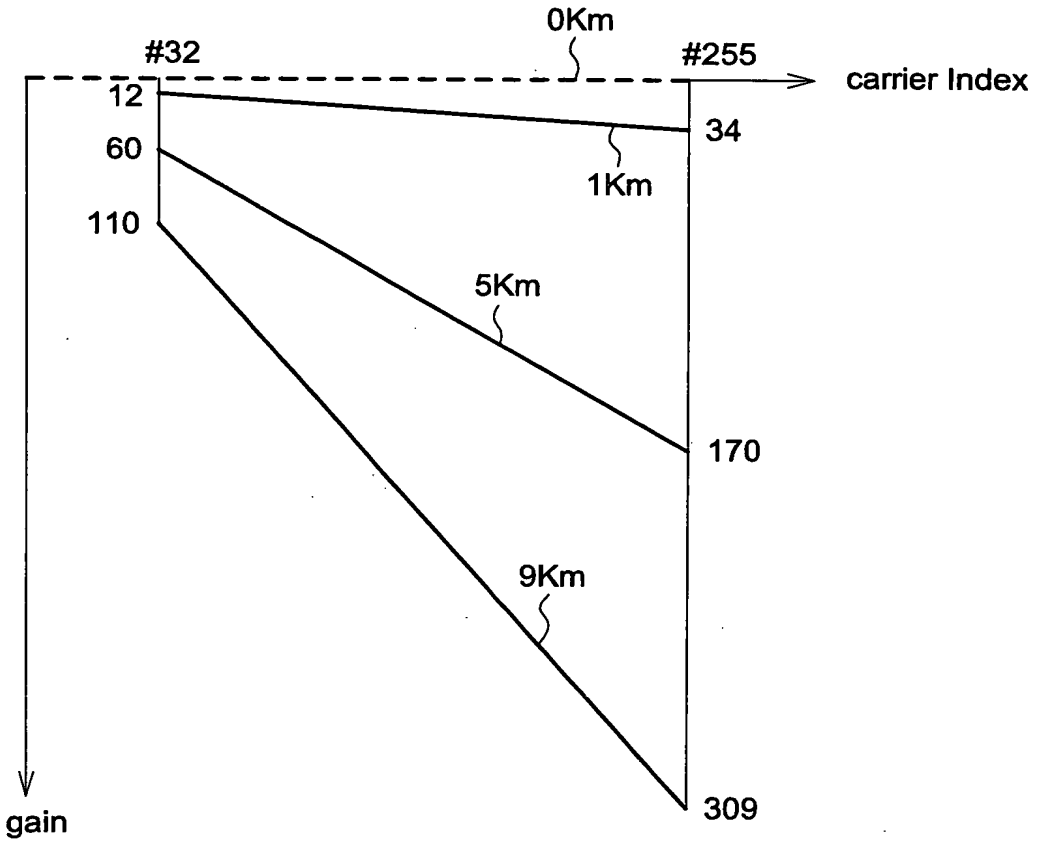

Fig.7

distance	Carrier Index N (frequency=4.3125KHz x N)						
	9	17	25	32	64	128	255
1Km	-8.89dB	-10.3dB	-11.4dB	-12.2dB	-16.0dB	-22.9dB	-34.3dB
5Km	-44.5dB	-51.6dB	-56.8dB	-61.1dB	-80.2dB	-114.6dB	-171.4dB
9Km	-80.0dB	-92.9dB	-102.3dB	-110.1dB	-144.4dB	-206.3dB	-308.6dB

Fig.8

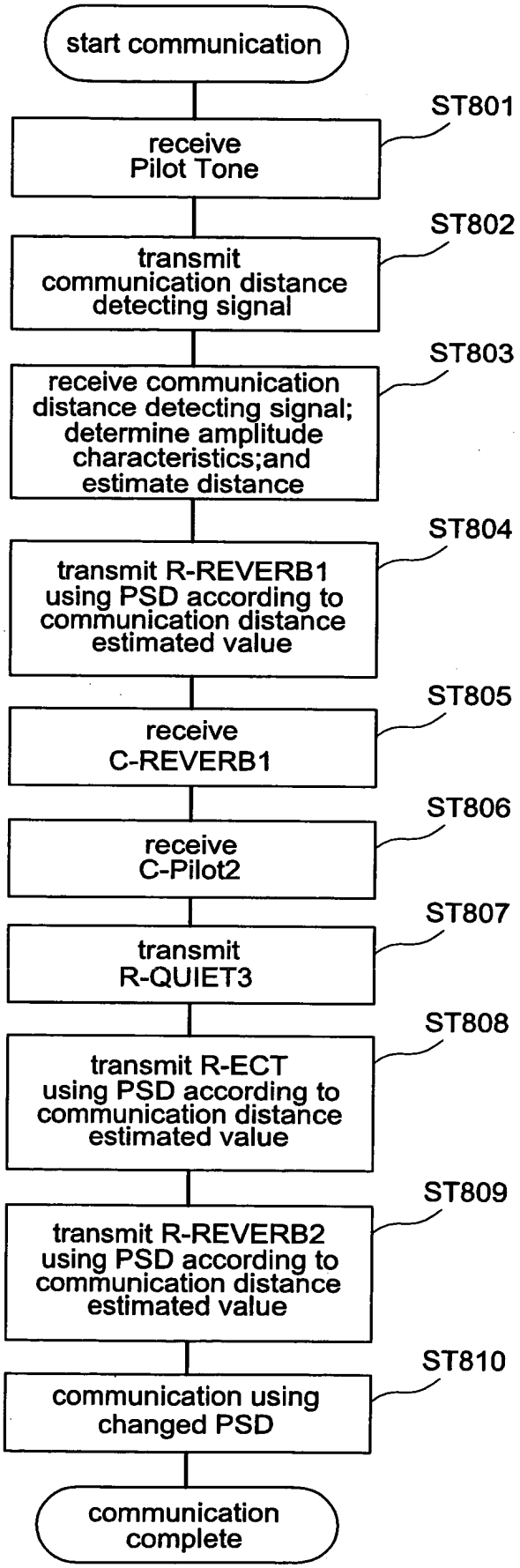
start communication
ST801
receive Pilot Tone
ST802
transmit communication distance detecting signal
ST803
receive communication distance detecting signal; determine amplitude characteristics;and estimate distance
ST804
transmit R-REVERB1 using PSD according to communication distance estimated value
ST805
receive C-REVERB1
ST806
receive C-Pilot2
ST807
transmit R-QUIET3
ST808
transmit R-ECT using PSD according to communication distance estimated value
ST809
transmit R-REVERB2 using PSD according to communication distance estimated value
ST810
communication using changed PSD
communication complete

Fig.9

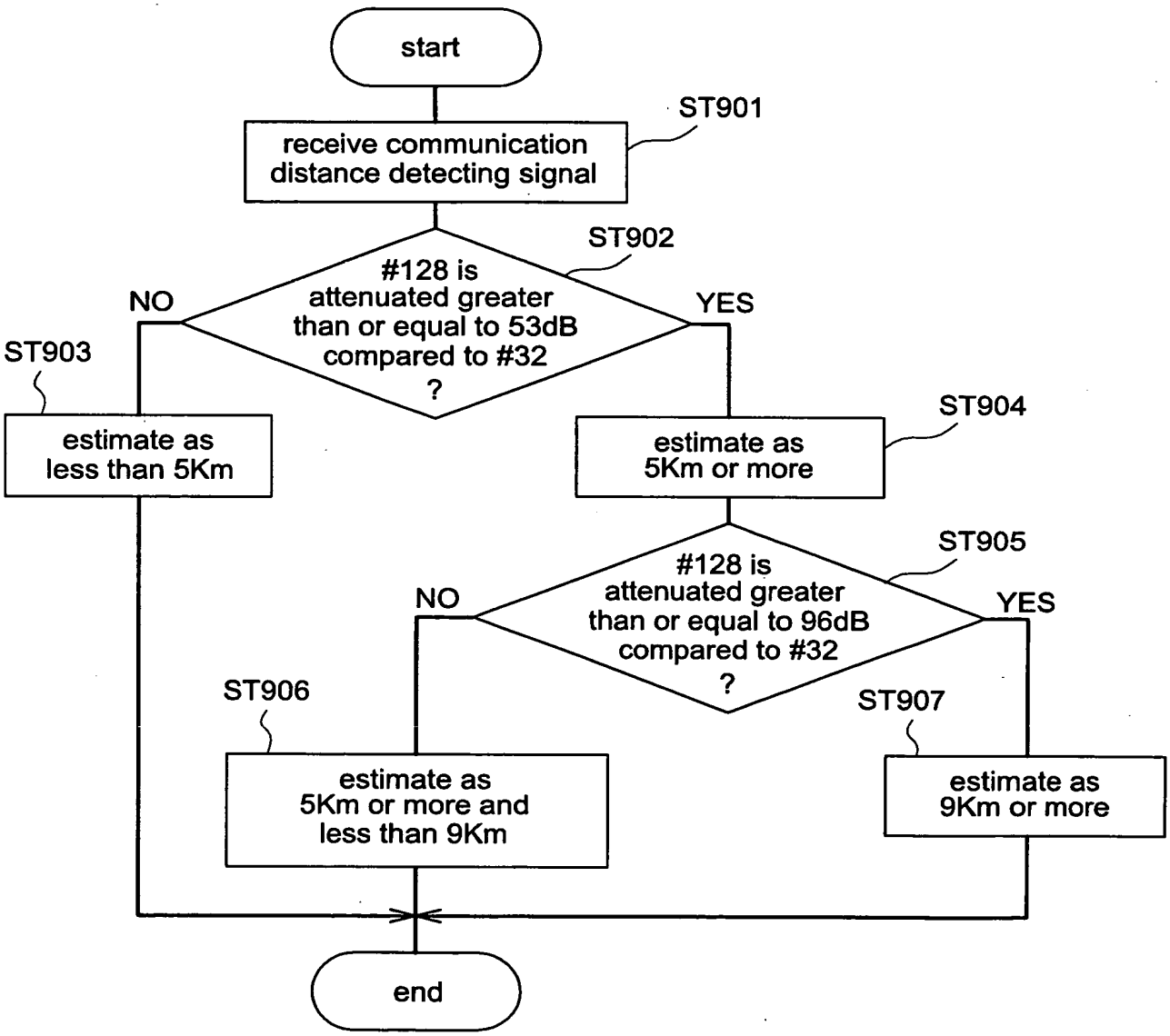
start
ST901
receive communication distance detecting signal
ST902
#128 is attenuated greater than or equal to 53dB compared to #32 ?
NO
YES
ST903
estimate as less than 5Km
ST904
estimate as 5Km or more
ST905
#128 is attenuated greater than or equal to 96dB compared to #32 ?
NO
YES
ST906
estimate as 5Km or more and less than 9Km
ST907
estimate as 9Km or more
end

Fig.10

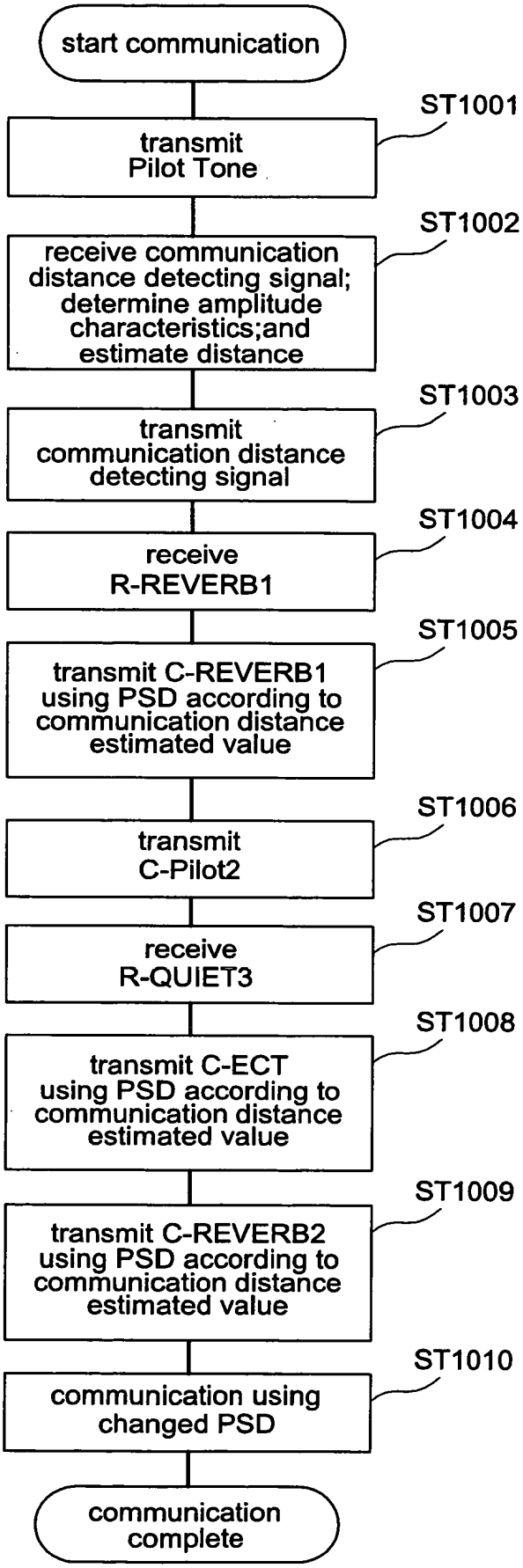
start communication
ST1001
transmit Pilot Tone
ST1002
receive communication distance detecting signal; determine amplitude characteristics;and estimate distance
ST1003
transmit communication distance detecting signal
ST1004
receive R-REVERB1
ST1005
transmit C-REVERB1 using PSD according to communication distance estimated value
ST1006
transmit C-Pilot2
ST1007
receive R-QUIET3
ST1008
transmit C-ECT using PSD according to communication distance estimated value
ST1009
transmit C-REVERB2 using PSD according to communication distance estimated value
ST1010
communication using changed PSD
communication complete

Fig.11

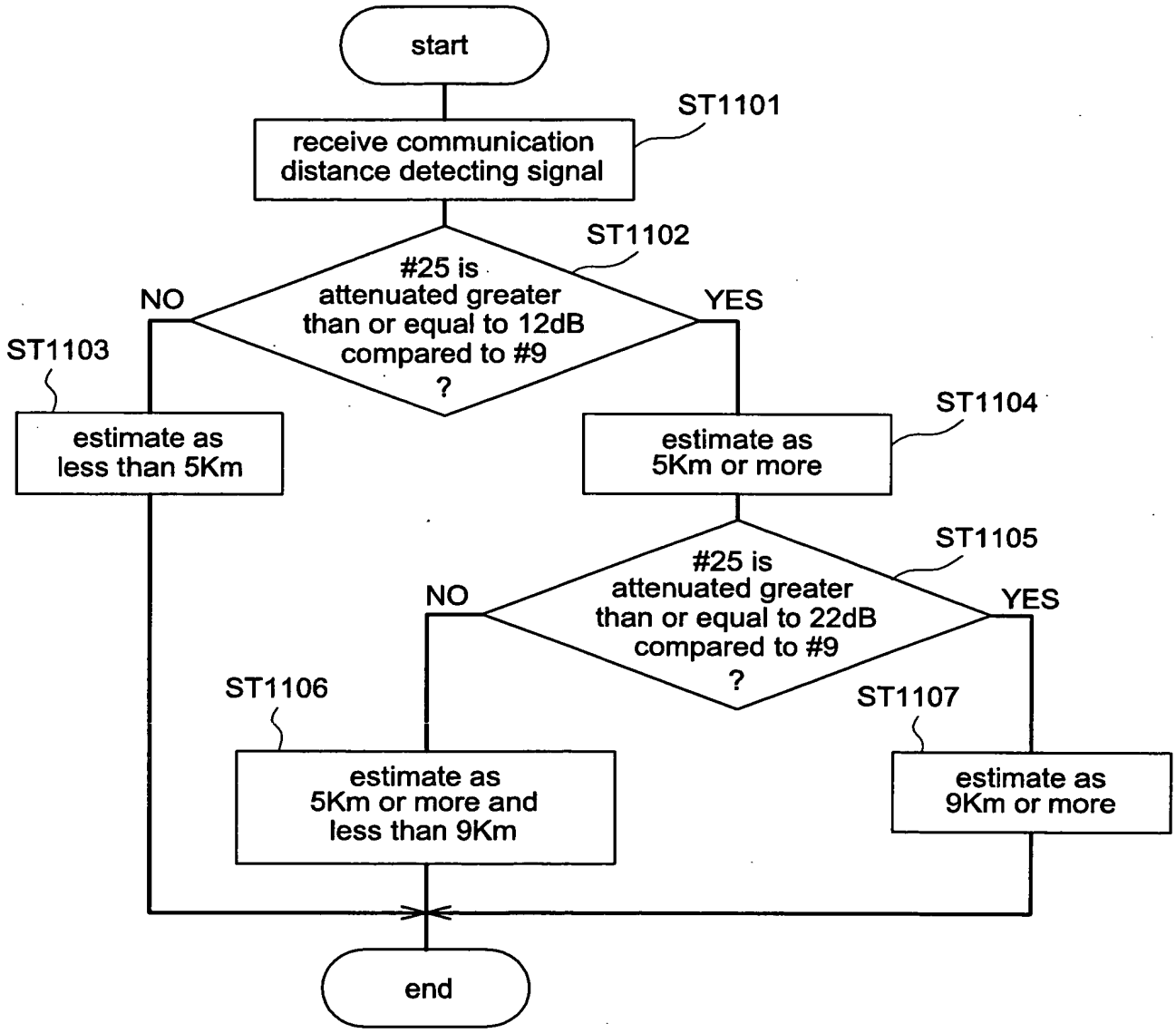
start
ST1101
receive communication distance detecting signal
ST1102
#25 is attenuated greater than or equal to 12dB compared to #9 ?
NO
YES
ST1103
estimate as less than 5Km
ST1104
estimate as 5Km or more
ST1105
#25 is attenuated greater than or equal to 22dB compared to #9 ?
NO
YES
ST1106
estimate as 5Km or more and less than 9Km
ST1107
estimate as 9Km or more
end

Fig.12

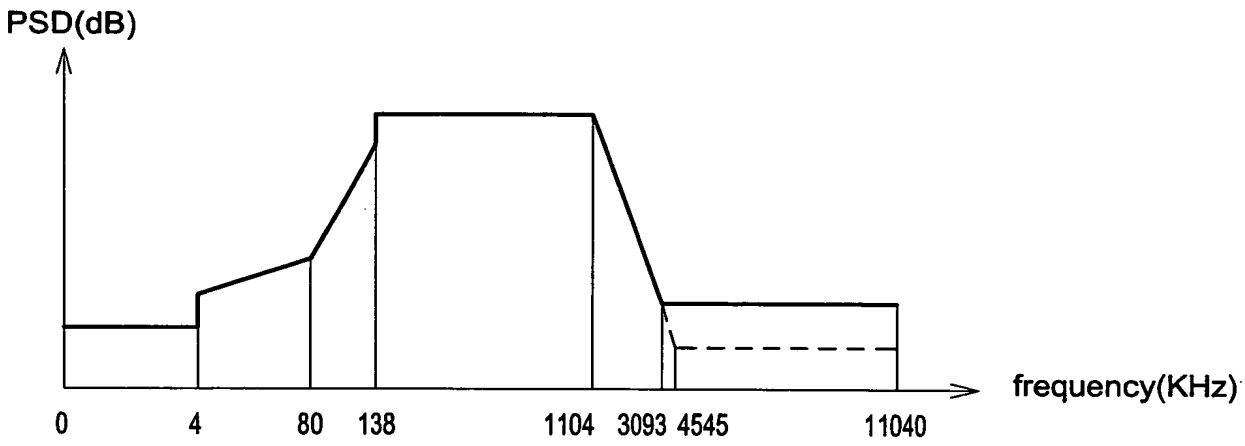
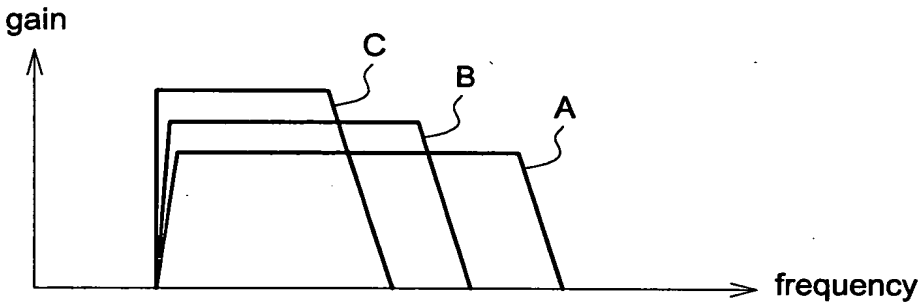
Fig.13